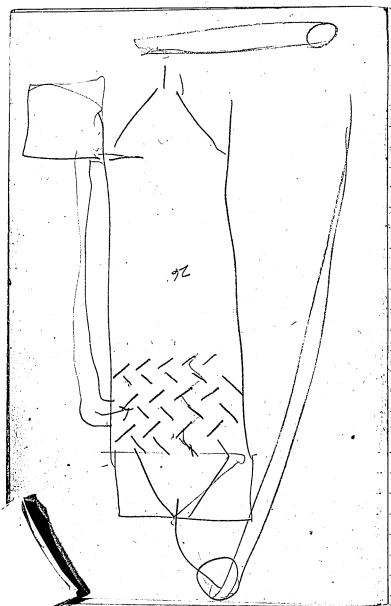
Notebook, N-93-08-01

This notebook covers the period August-November 1893. It was used by Joseph W. Harris for notes, tables, and calculations regarding ore milling, ore assays and other chemical analyses, and experiments on lubricants, phonograph cylinders, and the manufacture of parchment paper. Among the ore-related entries are a series of bricking experiments, nos. 1-110, together with cost calculations for each compound; and experiments in the production of cement from tailings of the concentrate at Edison's plant in Ogden. Among the phonograph-related material are two pages of notes on the examination of a wax cylinder made by the American Graphophone Co.; and a series of experiments, nos. 1-100, on a base for cylinders. The front cover is marked "Chemical Experiments by J. W. Harris." The pages are unnumbered. Approximately 190 pages have been used.



Aug 1st 89

Experiments on Resin

Ascertaining the % residue of resin, after heating to 600° F.

Weight of Resin + Dish	45.650 lbs
" " Dish	34.850 "
" " Resin	10.800 "

Residue + Dish	38.915
Dish	34.850
Residue	4.065

= 37.639 % Residue

1

Gm 4 - SO_4, $CaCO_3$, Ferrous Sulphate

#1 - 5 grams Rocin, 1 gram Ferrous Oxide
2 - 5 " " 1 " Carbonate Iron
3 - 5 " " 1 " Ferric Sulphate
4 - 5 " " 1 " Fuel Brimstone
5 - 5 " " 1 " Al_2O_3

#1 & #2 which in the case failed up the Gas being Wanted Decomposed,

#4 seemed satisfactory

#3 & 5 did not appear to present any chemical action, but lost WG the residue from metal d [illegible]

#1 - 91.175 - 87.25 = 4.5 - 1 = 3.5 = 70%
#2 87.00 82.00 = 5.0 - 1 = 4.0 = 80%
3 82.00 79.00 = 3.0 - 1 = 2.0 = 40%
4 89.00 85.5 = 3.5 - 1 = 2.5 = 50%
5 88 84.75 = 3.25 - 1 = 2.25 = 45%

The weight of residue from 5 grams Rocin is 2.26 grams, therefore the final residue of an experiment must weigh more than 3.25 grams

Wt	Grams	Contents	Total	Residue + crucible	Residue	% Residue
#6 87.25	5	1 mg. CO_3	93.25	91.5	3.25	65
#7 82.00	5	1 Mg O	89.00	86	3	60
#8 79.00	5	1 Mg NO_3	89.00	82.75	2.75	55
#9 85.5	5	1 Mg. acetate	91.5	87.5	3	60
#10 84.75	50 grams of Rocin mixture, 99 Sy 1% Lime		134.75	[illegible]		
#11 230	9 Rocin Lime	491 Lime	730	722.75		22.22
#12 86	5 R	26 Clay	111	108.2		40
13 86	5 Lime	50 Clay	141	137.5	1.5	30
14 82.5	5 "	20 $FeCl_3$	107.5	101		—
15 87	5 "	5 Clay	97	89%	X	—
16 83	5 "	3 Ca_2SO_4	91	89.2	2	40
17 85	5 "	5 Sulphate Lime	95	92.2	2	40
18 85.55	5 "	5 Sulphate Ferrous	95.5	92.5	2	40
19 86.5	5 "	5 Sulphate Lime	94.5	91.5	2	40
20 85.75	5 "	5 Ca_2CO_3	95.75	93.25	2.5	50
21 83	5 "	4 Silicate Soda	92	Failed		
22 83.25	5 -	2 Sugar	90.25	86.5	1.75	25
23 82.5	5 "	3 Peat	90.5	87.5	2	40
24 80.25	5 "	3 Ferrous	88.25	83.25	0	—
25 84	5 "	3 CaO	92	89	2	40
26 84.5	10 Lime Plain					
27 84.5	10 Lime					
28 38.75	10 Lime		48.75	41	2.25	22.5
29 28	5 Sulph. K		39.75	30	2	1.7
30						
31						

No.	Wt.	Time	Compound	Wt.	Residue	Residue	Residue	%
30	80.5	5 & R	5 Fe Cl	90.5	85.75	1.25	5	64
31	83.25	5.5 "	2 H_2SO_4	90.75	85.25	X	—	65
32	86.5	5 "	2 HNO_3	88.25	2.75	55		
33	82	5 "	2 HCl	83.5	1.5	30		
34	85.5	5 "	1 H_2SO_4	88.25	2	40		
35	86	5 "	1 H_2SO_4	87.75	X	—		
36	85.75	5 "	1 HNO_3	87.75	X	—		
37	82.75	5 "	5 Ca OCl	91.25	3	60		
38	84	5 "	5 H_2O_2	86	2	40		
39	81	5 "	5 HCl	80	—	—		
40	81.5	5 "	5 Formalin	82		10		
41	84.5	5 "	5 Glycerine	88	—			
42	77	5 "	5 Iodine	79	2	40		
43	86.5	5 "	5 NH_4OH	88.5	3	60		
44	83	5 "	5 $MnSO_4$	89.5	1.5	30		
45	83	5 "	5 Yellow	91.5	1.5	30		
46	84	5	5 Potash	90.5	1.5	30		
47	82	5	5 NH_4Cl	89.5	1.5	30		
48	83	5	5 $Mn(NO_3)_2$	87.5	2	40		
49	82	5	5 Potassium	88.5	1.5	30		
50	81.5	5 "	5 $CaCl_2$	89.5	3	60		
51	84.5	5 "	5 Magnesium Chloride	92	2.5	50		
52	82.5	5 "	5 $MgSO_4$	88.5	1	20		
53	79.5	5 "	5 $MgCl_2$	88.5	4	80		

No.	Weight of Brick	Brick	Compound	Wt.	Residue	Residue	Residue	%
54	84	5 F+R	5 $MgNO_3$		90.5	15	30	
55	82.5	5 F+R	5 Mg Sulfate		90	7.5	50	
56	Brick	made with the following preparation						
	Che	2240, F+R 22.5, $MgCl_2$ 2						
		not successful						
57	Che	2240	F+R 22.5 $Fe CO_3$, 15.					
58	Che	2240	F-10.8 R-8, $MgCO_3$ 3 - Coal 120					
			failure					
59	Che	2240	F-12, - H_2SO_4 1, H_2O_2 10 Coal 5.4					
			not good					
60	Che	2240	F 12, - H_2SO_4 1, H_2O_2 10 Coal 1.5					
			not brick					
61	Che	2240	F 10, R-4, H_2SO_4 1, H_2O_2 10,					
			not good					
62	Che	2240	F-15 H_2SO_4 2 - H_2O_2 0					
		F + H_2SO_4 + H_2O boiled and then added						
		to the ore, seems to brick fairly well.						
		Bricks not strong enough						
63	Che	2240	F-10, R-10, H_2SO_4 2, H_2O_2 0.					
		F R H_2SO_4 + H_2O all boiled together first						
		then added to the ore						
		not good						

64 Ore 2240, 8-10 R 10 H, Sly 1.
no good

65 Ore 2240, 8-5 - H. Sly-4.

66 Ore 2240 8-10 S-5, —
no good

67 - Ore 2240, 8-10, coal tar patch, 5
no gold -

68 - Ore 2240 - Sluge 10, Ore hot, 23.07
no good

69 Ore 2240 Sluge 15, Ore hot
Brick well
no cyb 185.5 - 184.5 8 cts

70, Ore 2240 Sluge 15, Lima 7.5 - Ore cold
Worst lick

71 Ore 2240 Sluge 15, Lima 5, Ore cold.
No good

72 Ore 2240 Sluge 20, Lima 3, no cold
20.7, Brick well, O.K. and 5.3 cts

73 - Ore 2240, Sluge 14, Lima 2,
Pan 1, Ore cold.
Worst mix, some little balls -

74 Ore 2240 Sluge 14, Lima 3, Pan 1
No good

75 Ore 2240, Sluge 17, Lima 3, Pan 1,
No good -

#72 is the best yet obtained

∴ Chrzzyo, Pur. - 30 P. 15

76 [illegible] 3.

77 [illegible] 15

[illegible]

No good

[illegible] mixed [illegible]

[illegible] H_2SO_4

[illegible] it solidifies, which

[illegible] the [illegible]

[illegible] change [illegible] from

the mixture, therefore it is

disadvantageous to have reagents

ground up so fine to be kept

any great length of time.

78 Chrzzyo, Pur. Rg. - 18

H_2SO_4 - 4.5

Not mixes

79 - Chrzzyo, Pur. Rg. - 12 -

mixed fast, then 4.5 H_2SO_4

without H_2SO_4 mixes well

[illegible] with H_2SO_4 acid

mixes well, dries very well,

Weight of brick before heating 167.25

" " after " 166.00

Lost - 1.25

∴ = 25% residue

The brick contained 1.66 grams

mixture by calculation,

Cost 12.75 cts.

80 Chrzzyo, Pur. Rg. 18 - H_2SO_4 2,

Chrz + Pur. mixed fast + H_2SO_4

added

No good, aint brick.

81 - Chrzzyo from 20 - H_2SO_4 4.5

from + H_2SO_4 combined fast

No good -

82 Ore 2240 [illegible] = 20 = 16.5 [illegible]
Ore fain mixed [illegible]
H_2SO_4 added [illegible]
No good –

83 Ore 2240 fain 1 – H_2SO_4, 2.5,
Lime, 2.5 –
H_2SO_4 + Lime sentured first,
+ rosin added – cut
no good –

84 Ore 2240, Rosin 9, Lime 15,
H_2SO_4 4.5
no good –

85 Ore 2240, Rosin + Lime reg. 9 –
HNO_3, 2 lbs.
no good.

86 Ore 2240 Rosin + Lime reg, 20 lbs
Sulphur 2 lbs.
no good

87 – Ore 2240 Rosin + Lime, 3.0
Sulphur 2 lbs.
O.K., bricks small
Weight, before heat., 177.75
" after " 177.25
= 80 % residue, cost 15 cts.

88 – Ore 2240, Rosin + Lime 2.5 –
Sulphur, 1 lb –
O.K.
Weight before heating 179.25
" after " 178.5
= 64.3 % residue
cost 12 cts.
brick is not as good as 87.

89 Ore 2240, Rosin 12 – Lime 10.
Sulphur 1.5
want brick.

90 Ore 2240 Rosin 12 – Lime 8
Sulphur 1.5
no good, want brick

91 Rosin 15 - Lima 10 [illegible] 1.5
Clear 22 [illegible]
[illegible] well [illegible]
Black well

92 Rosin 17, Lima 10,
Sulphur [illegible] C.K.
Original [illegible] weight 170.5
" " " cts. " 169.5
= 64.9% residue. 1.0
cost 13.9 cts

[illegible] Rosin 15, Lima 12
Sulphur 2 cts.
Fair
Weight 170.5
" 169.5
1.0 [illegible]
Residue 57.6%
Cost 15.8 cts

94 - Clear 2240, Rosin 20 Lima 12 - Sulphur 2
Fair Cost 16.7 cts
Wt 146.15
" aft. 145.
Residue 48%

95 2240 Ore
Rosin, 20, Lima 13, Sulphur
1.75 Good
Weight, 1# 1.950 Cost 16.8 cts
140.730
Tot 1.200 = 44.9% Residue

96 - Rosin 20 2240 ore Lima 13, Hematite 10
good.
Weight 136.850 cost 17 cts
135.760 = 55.8%
1.15

97 - 2240 ore Rosin 20, Lima 13, Na2CO3 3
good. Cost
Weight 153.300 16.1 cts
152
1.3
Residue 44.8%

98 Rosin 20, Lima 13, Clay, 2240
good - Cost
Weight - 144.900 15.1 cts
143.300
1.6 = 23.8% Residue

99 Cl. 22.40 Resin 20, Lime 13, Alk 2.5
1.2 - good.
Cl. 136.2 Cost 15.1 cts
" 135.05
1.15 Residue 43.4%
old 10, al 9.2 cts Cl.

100 Cl. 22.40, Resin 20, Lime 13, Sulphur 2.5
Good - 17.6 cts
Cl. 134.45
1 : 50%

101 Cl. 22.40, Resin 20, Lime 13
$Ca\,CO_3$ 2 Good
Cl. 128.2 Cost 15.9 cts
27.2 ($Ca\,CO_3$ allowed for)
Cl. cost 0.40 cts per lb. 1 = 49.9%

102 Cl. 22.40, Resin 20, Lime 13, Soda 3
fair
195.100 Cost 16.9 cts
143.850
1.25 = 40% residue

103 Cl. 22.40, Resin 20, Lime 15
Chloride of lime 10,
no good -

104 Cl. 22.40 Resin 20 Lime 13
Ferrous Sulphate 2.0
no good

105 Cl. 22.40, Resin 20, Lime 15
HNO_3 10,
137.2
136.1 Cost 16.9 cts
1.1 45% Residue

106 Cl. 22.40, Resin 20, Lime 13
HNO_3

Weight 131.95 Cost 25.1 cts
130.30
1.55 Residue 26%

107 - Cl. 22.40 Resin 20, Lime 13, HNO_3
1,
148.8
147.5 Cost 18.6 cts
1.3 Residue 40%

108 [illegible] 450. [illegible] 20. H. 50.

[illegible]

107 [illegible] 10

for 137.00

135.80 [illegible] 20. pots

1.2 [illegible] 31 %

110 [illegible]

[illegible]

[illegible] 137.7

Mercurio Nitrate of pure first of
[illegible] Clyde

Contains 54.36% Chloric = 39.35 5/6
fe, and 45.64% tailed

Assay of tailed for P_2O_5
digested 5 grams in HCl + a small
H_2SO_4 to oxidise any PH_3 which might
be formed.

Filter paper weighs 0.542 grams
1.1925
.6505

Filter paper weighs 0.527
2.866
2.239

Filter paper weighs 0.5142
0.6535
0.1393
Total yellow ppt = 3.0288 grams
= 0.04937 grams P = 2.27% P_2O_5

Cruda

Cruda

0.5585

0.5585

Feb. 41, 9.7.

0.822 "

0.917 %
0.5585
0.5245

0.5585
0.822
0.237

New find crude 67 % Phos

Oct. 18 38.7 - 48.4 - .3 = 9.4 = 96.3%
" 19 50.3 60.0 - 1 = 9.6 ac = 77.11%
" 20 60.3 71.4 - 1 = 11.0 88.35
" 21 55.9 67.1 - 1 11.1 89.15
" 22 63.6 74.37 = 10.6 ac = 85.14
" 23 53.5 - 67.8 - 14 - 3 - 3 = 14.0 ac = 82.00
" 24 32.9 - 47.5 - 0.3 = 14.3 = 83.14%
" 25 - 29.8 - 44.9 - 15.1 - 0.3 = 14.8 = 86.0422 = 86.04%
" 26 - 32.5 - 47.8 - 15.3 - 0.3 = 15.0 ac = 87.21
" 27 58.9 - 75.8 - 15.9 - 0.3 = 15.6 ac = 90.678 = 90.68%
28 - 81.4

24.8 - 39.8 = 15 ac - 14.7 =

Nov 16 - 56.0 - 71.8 = 15.8 - 0.3 = 15.5 = 90.12
Nov. 20 54.8 - 70.4 = 15.6 - 0.3 = 15.3 = 88.95

Experiments on applying for [illegible] Sept 12th 1893

#1 100 grams 14 mesh tails of [illegible]
5 gm Stage Oil.
2" x 1 1/2"
length 2 15/64 x 1 1/2

#2 100 grams 14 mesh tails
5 " Wood tar
3 X 1 1/2

Mixed hard to mix and not of a smooth plaster
2 15/16 x 1.5

#3 100 grams 14 mesh
10 " Wood tar
2 15/16 x 1 1/2
very plaster — stood dry, good
2 15/16 x 1.5

4

100 grams 14 mesh
7.5 " Wood tar
3 x 1 1/5 — fair
— 3/32 long 1 1/32 wide

5 Stage + Pinus 30 - 10 - 7 grams
100 grams 14 mesh tail
2 15/16 x 1 1/2 hell — good
2 15/16 x 1.5

6 — 100 grams 14 mesh
10 grams of Point Pinus Oil, rosy prepin
3 x 1 1/2 good
2 15/16 — 1 15/32

7 100 grams 14 mesh
10 " Pinus + Rosin mixture, Rosy
3 x 1 1/5 good
2 15/16 x 1 5/32

8 100 grams 14 mesh
10 " Rosy Oil + Rosin, Rosy
3 x 1 1/2 fair
2 15/16 x 1 1/2

9 – 100 grams 30 mesh tails
10 " Wood Tar –
3 X 1½
3 X 1½

10 100 grams 30 mesh tails
10 " Reg Sludge mixture –
3 X 1½ – fair
2 13/16 X 1½

11 100 grams 30 mesh –
10 " Lime & Rosin Reg –
V 3 X 1½ good –
2 31/32 X 1 1/5

12 – 100 grams 30 mesh –
10 " Lime & Rosin Reg
V 2 7/8 X 1½ good
2 7/8 X 1 5/4

13 – 100 grams 70 mesh –
10 " Lime & Rosin reg –
3 X 1½ very good –
3 X 1½

14 – 100 grams 70 mesh –
10 " Sludge mixture –
3 X 1½ very good –
2 13/16 X 1 15/32

15 – 100 grams 70 mesh
10 " Wood Tar
2 7/8 X 1½ very good –
2 55/64 1½

16 150 grams of fine Concentrates
10 " Lime & Rosin
3 X 1½ very good –

17 150 grams fine concentrates
10 " Wood Tar
3 X 1½ very good –

18 — 150

10

Data of cement experiments

No.	Length before heating	Length after heating	Breadth before heating	Breadth after heating	Contraction %	Remarks
1	3"	2 61/64	1.5"	1.5		
2	3"	2 15/16	1.5	1.5		
3	2 15/16"	2 13/16	1.5	1.5		
4	3"	2 29/32	1.5	1 15/32		
5	2 15/16"	2 15/16	1.5	1.5		fair
6	3	2 15/16	1.5	1 15/32		
7	3	2 13/16	1.5	1 15/32		
8	3	2 15/16	1.5	1.5		
9	3	3	1.5	1.5		Brittle
10	3	2 15/16	1.5	1 7/16		
11	3	2 31/32	1.5	1.5		Very fine
12	2 7/8	2 7/8	1.5	1.5		Very fine
13	3	3	1.5	1.5		Brittle
14	3	2 15/16	1.5	1 15/32		
15	2 7/8	2 55/64	1.5	1.5		
16	3		1.5			
17	3		1.5			
18	3		1.5			

A mixture of 20 lbs of reg. Pimiaol and Rosin (15 + 30) to 1 ton of 50 mesh concentrates was bricked and sample sent to Wm. C. Frick of Mahoning Rolling Mills Co. Hamilton, Pa. to be tried as a lining for puddling furnaces.

Made of [illegible]
[illegible] (1-2)
[illegible]
Tests by Mr. Edison were run in the
[illegible] & the highest leakage noted
[illegible] per square inch, the fee of
50 mesh tailings
no good, can not begin to mix it.

2. 45 lbs [illegible] resin mixture, 1 ton of 50
mesh tailings.
no good. cannot mix it.

3. 50 lbs resin mixture, 1 ton 50 mesh
tailings
no good, makes a very dry powder.

4. 60 lbs Rosin Mixture 1 ton 50 mesh tailings
makes a dry powder.

5
[illegible] lbs resin mixture to 1 ton 50 mesh tailings
mixes a little hard, but bricks well
might do where pressure can be
applied.
broke at 7 feet

6
100 lbs resin mixture, 1 ton 50 mesh tailings
mixes little hard, bricks well
not plastic, must use pressure to
use it.
broke at 3 feet

7.
150 lbs resin mixture 1 ton 50 mesh tailings
mixes well, bricks well, but is not
sufficiently plastic to use without
pressure.
did not break at 5 feet, not at 10 feet, broke at
25 feet probably good at 15 feet
8. 175 lbs resin mixture, 1 ton 50 mesh tailings
mixes well, is plastic enough for
use without pressure - stiffens & moulds
when hammered in.
did not break at 4 feet, broke at 10 feet

2.1 [illegible] 50 mesh [illegible]
[illegible] will [illegible]

10 - 28 lbs [illegible] 50 mesh concrete
[illegible] day, no good.

34.5 lbs [illegible] 1 ton 50 mesh
[illegible] mixes well, bricks
[illegible] smooth, plastic, to use
without trouble
chipped at 4 feet, broke at 8 feet,

12 - 41.5 lbs [illegible] 1 ton 5 mesh concrete
mixes fairly well and mix better
if warmed. bricks well, not
too plastic enough -
broke all to pieces at 10 feet, soft
13 - 55.5 lbs [illegible] 1 ton 50 mesh concrete
mixes well, bricks well, but
not plastic enough
broke at 4 feet, duplicate did not break at
2 feet, broke at 3 feet,

14 - 70 lbs [illegible] 1 ton 50 mesh concrete
mixes well, bricks well, is
plastic and should be for all
purposes.
chipped at 4 feet, chipped at 12 feet, broke
at 20 feet - pretty tough
15 - 105 lbs [illegible] 1 ton 50 mesh concrete
mixes well, bricks well but is
so very plastic that the bricks stick
to the mould.

16 30 lbs [illegible] 1 ton dust from lime
mach -
no good today.

17 - 40 lbs [illegible] 1 ton dust from lime
no good, to day.

18 50 lbs [illegible] 1 ton dust from lime
mixes well, bricks well, but is not
plastic. can be used only with press

19 - 60 lbs [illegible] 1 ton dust from lime
[illegible]
mixes well, bricks well, but not plastic enough -
did not break at 4 feet, broke at 10 feet

20 - 50 lbs rosin mortar, 1 ton dust from lime
mixes well, bricks well, but not plastic enough
chipped at 3 feet, broke at 5 feet

21 - 100 lbs rosin mortar, 1 ton dust from lime
mixes well, bricks well, + is plastic, but mixed better if mixed so -
chipped at 4 feet, duplicate broke at 8 feet

22 - 125 lbs rosin mortar, 1 ton dust from lime
mixes well, bricks well and is plastic enough (did not break at 4 feet, 10 feet, nor at 30 feet, chipped on second trial at 30 feet, very hard
23 - 150 lbs rosin mortar, 1 ton dust from lime
mixes well, bricks well, + is so plastic that it sticks to mould

24 - 30 lbs rosin mortar, 1 ton dust from lime dust (separated by blower)
does not mix as good -

25 - 40 lbs rosin mortar, 1 ton dust from lime dust (separated by blower)
mixes well, bricks well, but is not very good, is a little dry -
broke at 2 feet, dup. at 3 feet,

26 50 lbs rosin mortar, 1 ton dust from lime dust (separated by blower)
mixes well, bricks well, but not plastic
all 6 pieces at 3 feet, dup. same at 2 feet

27 - 60 lbs rosin mortar, 1 ton dust from lime dust (separated by blower)
mixes well, bricks well, but is not plastic -
broke at 4 feet, duplicate broke at 3 feet,

28 - 80 lbs rosin mortar, 1 ton dust from lime dust (separated by blower)
mixes well, bricks well, but not quite plastic enough -

Portland Cement 33 lbs, duplicate 33 lbs, same mark

29 - 100 lbs resin mixture, 1 ton of dust
Che (indurated [illegible])
mixes well, brings well in blocks,
and would do [illegible] well
chipped at 10 feet, broke at 25 feet, dropped 20 feet, blank
30 - 50 lbs resin mixture, 1 ton dust from
Che (indurated [illegible])
mixes well, brings well, [illegible]
[illegible] should do -
did not break at 5 feet, 15 feet, 20 feet at 10 feet, chipped
at 15 feet, dropped [illegible] 30 feet, very dense
31 - 100 lbs resin mixture, 1 ton dust from
Che (indurated [illegible])
mixes well, brings well, but has
a tendency to stick to mould,
is very plastic & should be better
for ordinary use than # 30
chipped at 4 feet, did not break further at 20
feet, duplicate broke at 10 feet, hard & dense

32 - 30 lbs resin mixture, 1 ton crude
Che - 14 mesh
no good, when mixed, is to dry -

33 - 40 lbs resin mixture, 1 ton crude Che
no good, to dry -

34 - 50 lbs resin mixture, 1 ton crude
Che, 14 mesh
no good, to dry when mixed

35 - 60 lbs resin mixture, 1 ton crude Che
no good to dry -

36 - 80 lbs resin mixture, 1 ton crude
ore - 14 mesh
mixes well, brings well, but
is a little dry.
broke at 6 feet, not so very hard.

37 - 100 lbs resin mixture, 1 ton crude Che
mixes well, brings well but
the particles are so large that
even though there is considerable
plasticity they do not adhere
crumbled at 4 feet, broke at 10 feet, hard
38 - 150 lbs resin mixture, 1 ton crude
ore - 14 mesh
mixes well - brings well is
very plastic but does not adhere
broke at 10 feet, did not break at 4 feet
can break with fingers, chip broke at 10 feet, but not at
5 feet - hard

Bricks were made from 50 mesh [illegible]
[illegible] & Penna Black,

40 lbs rosin molten (35 Rosin, 10 Penna fabricon) 1 ton tailings 30 mesh
not good, [illegible] too stiff
to crush

40 lbs rosin molten (30 rosin, 15 Penna)
1 ton tails
not good

40 lbs rosin molten, (30-15) 1 ton tails
no good

120 lbs rosin molten, (30-15) 1 ton tails,
mixes well, looks well, cannot say well use less rosin molten,
made 5 briq
4 of these briq were placed each in a carbon crucible box and surrounded with charcoal and heated in large furnace in room 3
The first taken out at an orange heat, second at a yellow heat, 3rd at a dull white heat 4th at a bright white heat -

Of these experiments which were found after 36 hours standing, the 1st + 2nd were no good being too brittle, the 3rd was very good, hard, + not contracted very much. The 4th had all contracted out of shape, was fused, and full of holes inside.
The 3rd was also very porous. Mr Edison thinks that if they had not been surrounded with charcoal, they would have done better - The experiment repeated without charcoal all other conditions remaining the same -

[illegible] of Burn's sample #5
of Sludge and [illegible] and
[illegible] was [illegible]
[illegible] of [illegible] mixed [illegible]
[illegible] 50 lbs [illegible]
[illegible] [illegible] [illegible] study
qualities, and would not burn,

Tried a mixture of 25 lbs sludge
and 15 pounds #5 sample, in the
fireback of range for improved
[illegible] [illegible] [illegible] when
[illegible] [illegible] [illegible] [illegible]

Experiments on Mixed Oleates

#1

Magnesium Oleate

15 grams Oleic Acid

3.5 " $MgCO_3$ Anhydrous.

added 5 grams Oleic acid.

is quite fluid at 300°, since about bit increased.

Cooled some from Petroleum & then dissolved in methylene, but as soon as Petroleum evaporated solidified at 350°?

Time Petroleum the same.

#2 Oleate of Calcium.

1 Part $CaCO_3$

5 " $C_{18}H_{34}O_2$

seemed to combine with $CaCO_3$

~~added~~ poured off the Oleic Acid, and added slaked lime, in the proportion of 9 Oleic acid, 1 of Anhydrous lime.

is thick at about 150°?

not good.

Chlor of Ba. 3

1 part $BaCl_2(H_2O)$
3 " $C_6H_8O_6$
5 grams Barium Hydrate
1.5 " Oleic Acid
added afterwards, 5 grams more Barium Hydrate

forms a brown gummy mass,
melted in "soap" at 350°C,
but brittle when cold

3-1
Acid 1 gram Perma Petrolatum to 5 grams
of above mixture - is brittle when cold -
added 1 gram more of Perma Petrolatum,
no brittle when cold.

3-2
5 grams above, 3 grams Yellow -
brittle when cold

4
Chlorate of Aluminum

2 parts Oleic Acid
1 " Aluminum Chloride

Combines without any difficulty, Hcl
being given off, at 350°C is quite
soapy and when cold is quite
a little brittle.
20 grams Oleic acid + 10 grams Al_2Cl_6
new mixt. It now weighs 21 grams -
To this added 3 grams Perma Petrolatum
added about 10 grams extra
To brittle.

5

Oleate of Alu

3.6 grms - Oleic Acid
6 " Al_2O_3
5 " Perma Petroleum

not good will not combine

#6 -

Barium Oleate,
2.5.6 Oleic Acid
10. Barium Carbonate -
after all combined,
5 Perma Petroleum -

Will not combine with the carbonate

~~#5~~ Use #2
7 6.4 Oleic Acid
5 Barium Hydrate,
after combination,
add 3 grams Perma Petrolu

at 3 90°F, is quite stringy,
but is little when added -

#7

Aluminum Oleate.

20 Oleic Acid
10 Al_2Cl_6 –
after combination, had gone down to 25 grams added 5 grams Pennsylvania Oil – at 350°F is quite ropy, removed from fire so as not to evaporate all Pennsylvania Oil –
still smells of HCl –

#8

Aluminum Oleate –

10 Oleic Acid
5 Al_2Cl_6 –
after combination, weight had reduced to 12.25 grams, added
2.5 grams Lima Petrolin
at 350°F is quite ropy
after cooling, was to brittle, added again
2.5 grams Lima Petrolin –
after cooling is still brittle, added again
2.5 grams Lima Petrolin –
after cooling to brittle added
2.5 grams Pennsylvania Petrolin,

9

Oleate of Iron

15 grams Oleic Acid
5 " Ferrous Carbonate.
does not combine.

10

Common Soap — and Lime Pet.
and Perma Pet.
is a little stiff at 40°C

10-1

10 grams Common Soap
10 " Perma Pet; added
10 " " "

#11

5 grams Common soap -
5 " Lima Petrolum
[illegible] fluid at 410°F,
stiff at 350°F
[illegible] when cold.

#12

5 grams Common soap -
2.5 " Lima Petrolum
fluid at [illegible]
stiff at 350°F
[illegible] when cold -

#13

5 grams Common soap
10 " Lima Petrolum
stiff at 340°F.
fluid at 410°F
slightly brittle when cold

#14

5 grams Common Soap
12.5 " Lima Petrolum -
fluid at 360°F -

#15

5 grams Common Soap
15 " Lima Petrolum

fluid at 350°F

#16

5 grams Common Soap -
5 " Perma Petrolum -

solid at 350°F
fluid at 400°F

#17

5 grams Common Soap
7.5 " Perma Petroleum

fluid at 400°F

#18

5 grams Common Soap
10 " Perma Petroleum

fluid at 370°F

#19

5 grams Common Soap -
12.5 " Perma Petroleum

fluid at 400 -
stiff at 340°F

#20

5 grams Common Soap -
15 " Perma Petroleum -

solid at 335°F -
fluid at 370°F
duplicate with other quantity of material, solid at 360°F.

#21

5 grams Common soap
25 " Perma Petroleum -

#22 - Duplicate of #20 with 20-60 after combustion it weighed 62 grams, loss of 22.5%.

A sample of H.20 weighing 50 grams was heated to about 100°C for 9 hours, & one hour the temp was up to 88°C. At the end of the heating it weighed about 30 grams, was still a lubricating oil, is dark when cold.

Experiments to determine the solubility of the sample of Sludge acid in Lima petroleum, and Shumbleduck acid sample H 5.

Sample #1.

Weighed 20 grams into a dish, and added enough lima petroleum to make it about the proper consistency for blacking purposes. It then weighed 22.5 grams. Which was boiling. It was not heated, simply stirred with a stick.

On adding a large quantity of lima petroleum to it, it completely dissolved, forming a sticky fluid, which still seems dissolved in addition of more lima.

Is soluble in lima

#2 –

[illegible] very still [illegible] residue
[illegible] of Sl[illegible]
[illegible]
added 5 grams of Lime
[illegible]
[illegible] After [illegible] time,
[illegible]
All good

#3 [illegible]
[illegible] 50 [illegible]
[illegible] 90 grams used
added 5 grams Lime
[illegible] time on heating
or cooling it became very brittle
due to contamination.

– NS good

#4

A oily carbon residue, smells strongly of SO_2.

10 grams used.
5 " Fine.

Note: It is milky it uses well it burns, but it separates out again on cooling.

Also good

#5 is a fluid -

#6 is a fluid - but it contains a substance which separates out in the old. On heating this substance dissolves and its odor is a fruity oil like. seems to be quite separate from the rest of the mass. Peppermint

It contains considerable free acid but does not smell of SO_2

H 7

is a dry acid residue, and
[illegible]

10 grams used
5 grams Lime.

It contains [illegible] %
[illegible] a considerable
[illegible] H_2SO_4
[illegible]

All good

H 8.

is a dry acid residue and
[illegible] H_2SO_4

10 grams used
5 " Lime.

Mixed with Lime which has
but separates when cold.

All good.

9

[illegible] mean time [illegible]
[illegible] is [illegible] of SO_2

70 grams used
3 " times added
2 " "

Is about right for [illegible] time
will [illegible]

is not perfectly soluble
[illegible] to [illegible] sticking

10

A thin sludge acid residue
and quite thin enough for bucking

70 grams used
1 " time

Is about right for bucking but
lie about 2 [illegible]

perfectly miscible in time

#. 11

Sample of sludge [illegible]
thing from [illegible]
[illegible] used
2 " Lime added
2 " "

It will do for [illegible] purposes with
a little lime.

soluble in Lime

12

Sample #1 sludge with some thin
sludge - (#5)
very good

13

Sample #9 with some thin sludge.
very good.

14

Sample #10 and some thin sludge -
good

15 -

Sample of #11 + some thin sludge
perfectly soluble -

Experiment on the manufacture of Parchmentized paper.
(See Hofmeister, Ann. Chem., Vol. 1, page 716).

H_2SO_4, sp. G. of 1.357 at 76°F.
used 50.5 cc H_2SO_4, 100 cc H_2O.
after mixing, it measured 142 cc.

#1
Sheet of linen paper immersed for about 1.5 seconds, and washed in a slightly alkaline water.
wet on both sides.

#2 Sheet of linen paper immersed for about 2.5 seconds, + washed in slightly alkaline water,
wet on both sides

#3 Sheet of linen paper immersed for about 3.5 seconds, and washed in slightly alkaline water.
wet on both sides

#6 Sheet immersed in acid solution for exactly 6 seconds & then washed in slightly alkaline water wet on one side only.
fair,

#5 Sheet immersed in acid solution for 10 seconds, & washed in a slightly alkaline water wet on one side only
fair,

#4 Sheet immersed in acid solution for 15 seconds, & washed in slightly alkaline water wet on one side only
no good.

#3 Sheet immersed in acid solution for 12½ seconds, & washed in a slightly alkaline water wet on one side only. no good

#8 Sheet immersed in acid solution for 15 seconds, and washed in alkaline water wet on one side only.
no good

#9 Sheet immersed in acid solution for 20 seconds, & washed in slightly alkaline water - wet on both sides
Temp. of the Thos soln, 71°7
fair,
In some of the above experiments, the paper only became heated with acid on one side, owing to the ~~opa~~ ~~itivity~~ of the repulsion between the paper & acid.

Experiment
H2 SO4 of sp g 1.390 temp 74°7
(See next page)

#10 Sheet immersed for 1 seconds washed in alkaline water, not fully immersed
no good

#11 Sheet immersed for 2 seconds washed in alkaline water - not fully immersed
no good

[illegible] 1.1.81
120 cc H_2SO_4 200 cc H_2O 2 gal.
[illegible] to 300 cc
at 111°-1.1 sp. gr. 1.390

#12 Sheet immersed for 3 seconds
washed in alkaline water, not
fully immersed.
no good

#13 Sheet immersed for 4 seconds
washed in alkaline water sheet
well immersed.
no good

14 Sheet immersed for 5 seconds
washed in alkaline water
fair

#15 Sheet immersed for 7 seconds
+ washed in alkaline water
fair

#16 Sheet immersed for 10 seconds
+ washed in alkaline water
fair

#17 Sheet immersed for 12 seconds
+ washed in alkaline water -
fair

#18 Sheet immersed for 15 seconds
+ washed in alkaline water
good

#19 Sheet immersed in acid for 20 seconds, and then washed in alkaline water

No good

#20 Sheet immersed for 25 seconds and then washed in alkaline water.

Good.

Examination of
Burns Sample of Sludge -

sample.
16, - 1.5 grams Burns sample
weighed in balanced dish
washed, by Mr. Edison, then
weighed again.
It seemed to dissolve in the
water, was filtered off.
no good

Act 5th

Experiments with #12 Sludge sample
to ascertain why it is not soluble
in Lime potash or I find a way
to make it soluble.
#12 sample is sludge as taken H2SO4
just as it is taken from the mill
it is very slow, black stuff.
It is a black black sticky mass
with a peculiar smell.

Results attended for H2SO4 -

On dissolving in Lime, about 10%
residue is left. This contains H2SO4.
The portion dissolved also contains H2SO4.

A portion was washed with water
until the water showed no more
H2SO4, it was then dried on a
steam bath, and dissolved in Lime

(Lime potash similar, no
free H2SO4).

On dissolving the washed sludge in
potash + then cleaning with Benzene
and evaporating on steam bath, the

consist of [illegible] gritty particles, resembling coke, [illegible] by the H_2SO_4.

A large quantity of residue was [illegible] black amorphous mass, having no [illegible] properties.

It is insoluble in ether, but soluble in an acid which [illegible] and unaltered by [illegible] HCl.

It is really pure carbon.

and a [illegible] glass weighing 9.560 grams was placed 900 milligrams of sludge and these were covered with Benzene and placed on steam bath until no more substance was dissolved. It was then cooled & dried & weighed.

9.680 grams
9.560

.120 | 900 :: x : 100 | 900 | 12000 | 13.3

= 13.3 %

This residue is almost entirely carbon.

After washing the sludge of its tars with benzene and the benzene removed by alcohol, the residue is soluble in chloroform, but not soluble in ether.

7. 100 grams of Pure Potash
added to water. Then H2SO4
3 grams H_2SO_4
5 " "
[illegible]
The three Tins (100 grams Pure
each) placed in steam bath
at 100° Cent. [illegible] to find
out if [illegible] lost or gain
in weight in [illegible]
[illegible] 24 hrs.

4 Biscuits made with a mixture of
50 lbs H 10 sludge and 22 lbs
lbs or oil sludge mixed with
[illegible] 1/3 flour, then remainder
of our added this prevents the sludge
from forming "balls" but it has
the disadvantage of dividing very
rapidly after it is mixed, on
account of the amount of oily
film which naturally forms a
[illegible] divider.
Baked at 350°F for 1 hour,
after it is baked it breaks
from a loaf of 4 feet, if the large
flat biscuits are used.

A piece of one weighing 97.400 grams
was placed in water to find out how
much it would absorb.
Time of immersion – 10.10 Am. Oct 11th
" " removal – 5.20 PM. Oct 11th
weighed 103.870
Gained 6.64 % water.

Assay of tails from received from Mr. Pickhan, Oct. 10th 1893

Tails H 1

2.5 grams, digested in 20 cc HCl, and HFl.

1st test 26.1 % fe

2nd " 25.6 % fe

mean 25.85 % fe chemical.

magnetic assay 12 % fe

Tails H 2

2.5 grams digested in HFl + HCl 20 cc HCl

gave 25.24 % fe chemical

magnetic assay 8.68 % fe

In standardizing permanganate solution, used 8.92 mg Fe which contains 0.129275 % fe, fe reduced in 50 cc iron mixture = 0.5 gram fe —

added 4.156 grams Fe —

added 5.081 gram Fe, first determination

" 5.088 " " " "

Standardization of Permanganate Sol.

3.325 mg. of almost bright iron wire dissolved in dilute H_2SO_4 diluted to 250 cc, 50 cc used —

4 cc.	57.2 - 65.0	(50 cc)	= 7.8 cc
57.2 - 65.1		(50 cc)	7.9 "
65.1 - 72.9		(50 cc)	7.8 "
72.9 - 80.6		(50 cc)	7.7 "

mean of 3 determinations, 7.8 cc =

1 cc = 8.526 mg fe.

80.7 - 83.8 = (20 cc) = 3.1

Same bricks were made in the #10 sludge as above, in the proportions of 1 ball per tow,
3 large flat bricks,
3 small round flat bricks

One large and one small brick placed to 560°F for 45 minutes

The small brick weighed 139.5 grams, was placed in H_2O at 6.00 P.M. to find out how much water it takes up, removed at 8.00 AM Oct 12 - weighed 142.750, takes up 4.62% H_2O

[illegible] placed to 400°F for 45 minutes do not appear to take up much water

Brick weighs 141.950 grams placed in H_2O at 11.00 Am - Oct 14th 1893, removed at 8.15 Oct 16th 1893 weighs 147.7, increased 4.05% in weight in 45 hours made in sewer press

One large and one small brick placed to 560°F for 45 minutes do not appear to take up much water - take up less than #4

Sample distributed for water absorption
weighs 138.420 grams, removed at 9.30 Am Oct 14 removed Oct 16th at 8.15 Am weighed 141.250 grams increased 2.05% in weight, in 47 hours made in sewer press

Tries bricks with #10 sludge and lime -
40 lbs sludge, 5 lbs lime,
mixes well, does not flow after [illegible] when bricked, water as thick as old water brick, and molded bricks above water.

#2
45 lbs sludge #10, 5 lbs lime, mixes well flows a little, is not sticky, crazes when bricked and takes up water before baking -

#3

30 lbs. Baltimore Sludge, 10 lbs lime, mixed in 20 lbs. water, mixed well. Dried a little after it is mixed. Did not stick. After bricking, it took up a very small quantity of water, compared with #1 & #2.

#4

30 Baltimore Sludge, 5 lbs Lime - 40 lbs this mixture for ten minutes well in 20 lbs water, somewhat sticky, but could be more so. After bricking, is water repellent.

3 bricks made as above, heated to 405°F for 30 minutes were still soft when removed. When cold, are decided water repellant.

brick weighing 143 grams placed in water at 10.00 Am Oct 13, removed at 8.30 Am Oct 14, weighed 159.1 grams increase 8.9% in weight in 22½ hours.

#5

Duplicate of #4, heated to 400°F for 1 hour, hard when removed - when cold was water repellant - a brick weighing 134.285 grams was placed in water at 4.00 PM Oct 12th 1893.

Removed at 9.15 Am Oct 13th 1893 weighed 135.810 grams, an increase of 0.88% in weight after an immersion of 17¼ hours.

Steel castings made with sand as silicate, just as they are when removed from the mould, were treated with HCl, which decomposed the silicates, and the slag was easily removed.

A large casting was supported or suspended from a trunnel and every two hours, a bath of HCl was lifted up, to immerse the casting for 1 minute.

At the end of the 6th dip there was still some hard silicate fast to the steel. The steel became badly pitted or coated with Fe_2Cl_6 by the treatment.

Oct 13th 1893

Determination of loss in #10 sludge caused by washing it until it gave no longer an acid reaction to litmus water. Old method.

Weight of small evaporating dish	34.852
" " sludge & dish	38.074
" " sludge	3.222
Weight of glass stirring rod	3.202
Weight of dry sludge & glass rod after washing	41.276
	40.244
Loss in weight	1.032
Weight of washed sludge by difference	3.222
	1.032
	2.190

3.222) 1.032000 (32.03
9666
6540
6444
9600

Loss 32 %

In another case lost nearly 50 %, but it was because a large portion of the sludge had separated. 32 % will probably be normal.

6

Washed some #10 until it gave no acid reaction to the wash water, heated it until all the water was evaporated. If it is used without evaporating the water it does not make a sticky brick, as the sludge feels it much like a lubricator.

When the water is driven off it is not so sticky even. Then made a brick with 1 pt of the dried sludge, + 5 lbs lime, it was still repellant before heating. Was heated to 395°F for 1 hour + 10 minutes, was very hard when taken out, did not give off any volatile gases. The brick was made in some press, and a fair pressure applied to it.

Weight 170.110 grams, placed in H_2O at 11.30 Oct 14th removed at 9.15 Am, Oct 16th 1893, weighed 174.550 grams, increased 2.6 % in weight in 45 hours.

Brick made from Pattinson Sludge (30 to 45), 40 lbs per ton, in iron mould, which makes a slight bit of the shining effect.

This brick was made in same press, in mould, pressure being kept to 375 # for 1 hr. 10 minutes, when removed, gas off vapor, and was not had a little bring proven off by a gentle pressure of the tongs.

The more pressure applied in making bricks, the harder they seem to be when removed from the furnace. The #6 brick described on last page ~~[illegible]~~, had a gentle pressure applied, and is fully 3 times as hard when removed from the oven. They were both placed in and removed together.

7

A brick was made with #10 sludge well washed, mixture consisting of 50 lbs sludge, 5 lbs lime, 45 lbs being used per ton. It mixing well, in sections, became fairly sticky, seemed to fall to pieces but after moulding, it absorbed water in other products, it seemed to be very good.

Brick made of Pattinson sludge #7 [illegible] had been removed brick made in hand mould by hand brick weighs 163.170 grams, placed in water at 9:00 Am, Oct 16th 1893

Removed at 4:15 Pm, Oct 17 - 1893, after an immersion of 23 1/4 hours, weighed 166.220 grams an increase of 1.25 % due to water.

#8

30 lbs of water #10 sludge for 224 lbs of pure Lima oil, mixed in water.
Not good - sand dry after mixing, would require 125 lbs per 224 lbs to be any good.

#9

Brick made with 35 lbs of washed and dried #12 sludge, 5 lbs Lima Petroleum, 4 lbs of mineral per 224 lbs ore.
Mixture well, fairly sticky. Bricks well, is quite strong, but not quite shelly. After baking placed in oven and slowly heated 400° F for 1 hours. Hard when removed. brick made in hand mould, by hand. Brick weighs 157.050 grams.
Placed in water at 9.00 Am Oct 16th 1893
Removed 2.15 Pm Oct 17th 1893, after an immersion of 23 1/4 hours. weighed 160.220 grams. An increase of 2.02 % due to water.

Oct 16th

Experiments on sample # 11
of Burnt Sludge and sample
from Rose Island, E. F. Cove.

10

Was removed from jar, smelled
strongly of SO_2

[illegible] not lime in the
preparation of 30 - 10,
used 40 lbs fuel
[illegible] slight smell when
removed [illegible]

11

used 30 lbs #11 sludge with 15 lbs
lime. The sludge seems to have
oxidized, as it does not appear
to be perfectly soluble in dilute acid.
When mixed with the air, the
mixture is not sticky, and when
kicked in hand would by hand
the brick cracks as 30 water dries.
When made into screw press,
appears to be all right.
Brick made in screw press -
Sp. Gr. 1.0107 for 1 hour. It gave
offensive vapor when removed
After cooling it weighed 163.2 grams
placed in H2O at 4.15 PM. Oct 16th
Removed at 8.15 AM, Oct 17th 1893, after an
immersion of 12 hours. Weighed 166.03 gm
an increase of 1.73% due to water

#12

30 lbs #11 sludge, 12 lbs Lime,
42 lbs used per ton.
mixes well, when bricked by hand,
splits, is all right when bricked
in press.
Yellow when mixed, when bricked
before baking is water repellant,
is quite sticky.
Brick made in press.
heated to 410° F. for 1 hour, did
not fire off volatile matter
when from furnace.
After cooling it weighed 142.975 grams,
placed in H_2O at 4.15 PM Oct. 16th
Removed 8.15 AM Oct. 17th 1893 after an
immersion of 12 hours. Weighed 145.330 grams
an increase of 1.64 % due to water.
no good if made by hand.

#13

35 lbs #1 sludge, 5 lbs lime
40 lbs per ton.
mixes well, "flows" well is sticky
when bricked is water repellant,
made in hand moulds, by hammer
is water repellant.
heated to 410° F for 1 hour.
brick made by hammer.
when removed from furnace it
still gives off volatile matter, which
soon stopped.
After cooling it weighed 113.750 grams
placed in water at 2.30 PM Oct 17th
Removed at 8.45 AM after an immer-
sion of 18 1/4 hours weighed 115.330 grams
an increase of 1.3 % due to water

#14

Brick made with a mixture of 30 lbs #11 sludge, 12 lbs lime Pulos, using 50 lbs of this mixture for 1 foot.
Brick well, dries very well does not crack by hammer in small mold, "Flow" well, is water repellant.
Brick made by hammer.
Dried to 110° F. 1 hr.
Then removed for furnace still warm from mold, which was 100° F.
After cooling, weighed 127.420 grams, placed in water at 2:30 PM, Oct 17th removed at 8:45 Am, Oct 18th after an immersion of 18 1/4 hours weighed 130.300 grams.
An increase of 2.26 % due to water.

#15

Brick made with a mixture of 30 lbs #11 sludge, 12 lbs lime, using 45 lbs water.
Mixture pretty well, is not very sticky, has a tendency to crack when dried by hammer, although it does not crack along lines.
"Flow" fair well.
When dried by hammer, is water repellant, although the surface is not.
Dried by hammer.
After cooling, weighed 116.210 grams, placed in water at 2:30 PM.
removed at 8:45 Am, Oct 18th after an immersion of 18 1/4 hours weighed 118.950 grams.
An increase of 2.35 % due to water.

#16

75 lbs #27 sludge unwtr
well ground up to 1 to 2
mesh

#17

75 lbs #27 sludge, well ground
5 lbs Lima,
2240 lbs ne –

ne grind

#18

50 lbs #27 sludge, well ground
10 " molasses
2240 " Clay

no good -

Mixed some well ground #27 with Resinate of Soda,
10 grams Resinate
10 grams #27 Sludge,

seemed to form a coalescence mass, which on heating with lime, soda [illegible] with flame, carbon [illegible] residue. The #27 separated out again while the Resinate dissolved in the Lime.

Boiling Caustic Soda strong sol. does not seem to have any action on thoroughly washed #27 residue.

The residue after treatment with Na_2O is soluble in Turpentine.
Turpentine cost 4 cts per lb.
An adding lime to its turpentine solution the sludge ppts.

Unwashed Tacoma sludge can be ground up with a small amount of turpentine [illegible] and make a stiff mass of upon heating but 20 drops of Lima or Pennsylvania petroleum left the sludge.

#1

3 Parts 27 Sludge which has been heated with $Na_2O + H_2O$ and 1 part Rosin Oil, well ground together and heated.

#2

Washed 27 Sludge and Rosin Oil heated. (Sludge not treated with Na O)

3

#27 Sludge washed & treated with Na O dissolved in Turpentine requires an excess of turpentine

(See further after exp't # 25)

#19

50 lbs # 19 Sludge,
1 tem Oil

no good

20 -

50 lbs #19 Sludge
Lime -
1 ton ore -

no good -

21

75 lbs # 19 Sludge
1 ton Ore

no good

22

75 lbs # 19 Sludge
5 " Lime
1 ton Ore

no good

can be leached, but is very weak, & absorbs water.

23

75 lbs # 19 Sludge
10 " Lime
1 ton Ore,

no good

can not be leached without crushing, absorbs water.

24

100 lbs H 19 Sludge
1 ton of ore

mixes well, cancel bucket
but brick is weak, & absorbs
water.

25

100 lbs #19 Sludge
5 " Lime
1 ton Ore

mixes well, brick is good
is weak, & absorbs water

(In each case, 2 [illegible]
#19)

#4

5 lbs #27 treated with Na_2O
1 " Rosin Oil -
ground in mortar, not heated

5

5 lbs #27 Treated with Na_2O
1 lb Rosin Oil
4 " Lima Petroleum

6

5 lbs #27 treated with Na_2O
1 " Rosin Oil
2 " Lima -
30 lbs this sample per ton
no good

7

4 lbs #27 treated with Na_2O
1 " Rosin Oil -
30 lbs per ton
no good

8

4 lbs #27 treated with Na_2O
1 lb Rosin Oil -
40 lbs per ton, no good -

(In this exp't, rosin Oil was x 12 oz)

#9

#27 Sludge treated with Na_2Cl_3
dissolved in turpentine.

#10

#27 Sludge treated with Na_2O melted with
an equal weight of Rosin.
it formed a flask bottle mass
Sludge separates on dissolving in Lima Oil
" " " " " Lima "

Sludge does not separate on dissolving in benzine, unless turpentine is added. Sometimes, upon shaking the sludge, ppt. in a fine liquid state, showing that it is mixed or emulsified.

is insoluble in naphtha

Sludge separates on dissolving in benzine.
" " " " kerosene
" " " " " gasoline

Asphalt is insoluble in benzine, gasoline, kerosene & naphtha. Sludge ppts. from benzine.

Incompletely soluble in Toluol

insoluble in NaOH hot & cold.

is completely soluble in coal tar, forms a sticky mass

#27 Sludge treated with NaOH is completely soluble in coal tar.

#11

#27 Sludge treated with NaOH 2 parts
Coal tar 1 "
mixed on steam heater,
it is insoluble in lima Petroleum

Coal tar is soluble in
Benzole
Toluol
Turpentine
Room Chl
Chloroform
is insoluble in
naphtha
Gasoline
Benzine
Alcohol
Lima Petroleum
Lima Petroleum
can be mixed with strong
caustic soda.

200 grams of #30 sludge washed was ground up, and washed until it gave no further sulphate test, with $BaCl_2$ solution, & dry wgt. of weight 175 grams, a loss of 12½ %

#12

Grind a portion of the sludge also with dry slaked lime in agate mortar, then [illegible] as sludge.

13

Portion of washed #30 sludge ground with an equal weight of $CaCO_3$, and heated.

#14

Portion of washed sludge ground with an equal weight of Plaster of Paris, & heated.

15

Portion of #30 washed sludge ground with an equal weight of Cu_2O and sulphur, and heated.

16.

Portion of washed #30 sludge, ground with an equal weight of calcium sulphide, & heated.

17

[illegible] washed + boiled with also an equal weight of [illegible] calcined in a "muddy" state. Mr Edison thought the previous chemical reduce it to a [illegible] [illegible] instead, [illegible] to [illegible] [illegible]

The combination is not effective because [illegible] the sludge divides [illegible]

18

Some #30 sludge washed, well ground with an equal weight of hydrated Sodium Hypo-Sulphite

19

Some #30 washed sludge, well ground with an equal weight of Soda Lime.

20

Some #30 washed sludge, well ground and heated with an equal weight of Sodium bisulphite

21

Some #30 sludge, washed + well ground + heated with an equal weight of [illegible] Sodium acetate.

22

Some #30 sludge washed, well ground with an equal weight of Common salt, heated the mixture.

23

Some #30 Sludge washed + well ground with an equal weight of Sodium Carbonate, hydrated + heated.

24 -

Same #30 sludge, mixed, well ground & treated with equal weight of Dry Soda Nitrate

25

Same #30 mixed sludge, well ground & treated with sodium sulphide, with weight used.

26

Same #30 sludge, mixed, & well ground & treated with one - Sodium Nitrate

27

make duplicate of #21 - added ~~some~~ Penna Petroleum in the proportion of 30 lbs #21 - 5 lbs Penna, and 35 lbs of this per ton of ore

was good, was dry, quite much of a difference of a little oil in it. Coal had to be broken,

28

duplicate of #25 30 lbs - Penna Petroleum - 5 lbs Soda & Tar - gently & added to 1 ton of ore

was good as dry, does not hold its shape when broken it falls to pieces in taking from the mould.

29

[illegible] 30 lbs, 5 lbs. [illegible]
lbs, [illegible]
[illegible] falls to pieces
[illegible] mould.

30

Duplicate #25, 30 lbs, 3 lbs
Coal Tar, mixed, warmed, &
mixed with 1 lb. [illegible]
Coating the coal tar, & heating it
to spread the sludge from the mass
and it became somewhat sticky,
no good, falls to pieces in
removing from the mould.

31

Duplicate #25 - 30 lbs, Rosin
10 lbs - warmed, well ground together in
a mortar, warmed again & mixed
with 1 lb. oil.
no good does not hold its
shape.

32

Duplicate # 31, 30 lbs, 5 lbs Rosin
10 lb, mixed well, warmed to make
more fluid, & mixed with one
ton of oil.
no good - falls to pieces on
removing from mould.

33

duplicate #21, 30 lbs, 5 lbs coal tar, no good, [illegible] of mold [illegible] [illegible].

34

duplicate #21, 30 lbs, 5 lbs rosin, 5 lbs pitch - well ground, & heated gently - mixed with 1 ton air.

No good, fails to pierce box, sticking from mould.

35

equal weights of #30 washed sludge, and Potassium Sulphide well ground and heated.

36

equal weights of #30 washed sludge, and Potassium ferro cyanide, well ground and heated.

37

Equal weights of #30 washed sludge and Potassium Cyanide, well ground and heated -

38

[illegible] 1/4 its weight [illegible] ground [illegible] gill [illegible]

39

#30 washed sludge, ground & heated with an equal weight of H_2SO_4 Acid only dried

40

#30 washed sludge, ground & heated with an equal weight of $BaSO_4$

41

#30 washed sludge, ground & heated with an equal weight of $BaCO_3$

Oct. 25th 1893

Tested Lime with the following substances in pot dishes.

50 grams Lime, 5 grams $BaCl_2$ heated to gentle boiling.

50 grams Lime, 5 grams HFl, heated in coated dish to gentle boiling

50 grams Lime, 5 grams P_2O_5, heated to gentle boiling.
The Cl has been completely combined seems like a sludge, but has no smell

50 grams Lime, 5 grams Arsenic Acid heated to gentle boiling.
On Mar 19th 1894 this mixture smells like a fatty acid.

saturated

43

#30 sludge washed ground & heated with an equal weight of BaOH

43

#30 washed sludge ground & heated with an equal weight of BaO_2

44

#30 washed sludge ground & heated with an equal weight of BaS

45

#30 washed sludge, ground & heated with an equal weight of $(NH_4)_2SO_4$

46

#30 washed sludge, ground & heated with an equal weight of Al. Cl.

47

#30 washed sludge ground & heated with an equal weight of ammonium alum.

48

#30 washed sludge, ground & heated with an equal weight of Alum. Chlorine

49

#30 washed sludge, ground & heated with Na Cl

50

#30 sludge, washed, ground & heated with an equal weight of aluminum fosmate

51

#30 washed sludge, ground & heated with an equal weight of cryolite.

52

#30 washed sludge, ground & heated with an equal weight of Infusorial earth.

Oct 26 - 1893.

Experiments on the treatment of Sawdust with 1/2 its weight of H_2SO_4 of 1.66 sp. G. contains some water extra. The sawdust passed through a 12 mesh sieve to take out chips etc.

#1

20 grams H_2SO_4 of 1.66 sp.g.
40 " fine sawdust
mixed and heated in the boiling water bath. heated longer than the other 1/2 until it was very dry. to driff SO_2.

Experiments on bricks made with sulphuric acid.

#1

1 ton ore,

100 lbs of a 10% sol. of H_2SO_4 by weight placed in dish & heated on sand bath

not good.

#2

1 ton Ore –

50 lbs. 10% sol. H_2SO_4 by weight –

mixture dished & marked #2. heated on sand bath

no good

#3

1 ton Ore

50 lbs of a 20% sol H_2SO_4 by weight

no good

#4

1 ton Ore –

25 lbs – of a 20% sol H_2SO_4 by weight

no good

#5

1 ton ore -
50 lbs of a 40% sol H_2SO_4 by weight.

#6 -

100 lbs of a 50% sol of crystallized $FeSO_4$
1 ton Ore.

#7

25 lbs H_2SO_4, sp gr 1.66
1 ton Ore -

#8

50 lbs of a 50% sol crystallized $FeSO_4$
1 ton ore -

#9 containing

25 lbs of a 50% sol $FeSO_4$
1 ton ore -

10

about 10 cc of a 1:1 sol. of sulphuric
of aluminum -
225 grams ore.
is about equal to
150-200 lbs conc. sol Al_2SO_4
1 ton ore.

#11

100 lbs of a 25% sol of Al_2SO_4
1 ton Ore -

12

200 lbs of a 20% sol H_2SO_4
1 ton ore -
Acid poured on ore.

13

300 lbs of a 10% sol of H_2SO_4
1 ton Clu.

Clot – 30th

225 lbs Clu –
4 lbs La mixture of 30 lbs sludge
and 5 lbs lime.
Bricks made in square mould, having
plane surfaces at each side,
were heated to 440° for 1 hour when
removed, were slightly off.
More were heated to 560° for 1
hour, were not quite burnt in
removed, + still gave off sufficient of
sludge acid.
Remainder were heated to 560°7
until no more vapors were
given off, required 3 hours.
When cold one brick was
thrown in the air as follows
6 feet, did not break.
12 " " " "
25 " " " "
75 " " " " but the
corners were knocked off.
In each case, it fell on a
wood floor.
In heating the bricks vapors do not
seem to be given off as heavy fumes
until after a temp of 425°7 has
been reached, or at 400°7 after a

much longer time.
A lot of bricks heated to a temp of
[illegible] Lime vapors
stopped coming off.
All stands all night except
[illegible] as high as the main
[illegible] building and fell in the
used [illegible] outside of chemical room.
They only slipped a little at the corners.
A little of the brick weighing 85.170
grams was placed in water at 10.30 am
Nov 3rd 1893 to test as to minute
water is absorbed.
Removed at 9.30 AM. Nov 4th 1893 weighed
88.610 grams, an increase of 4.4% due
to water.
Brick heated to 500°F for about 1 hour
gases still came off.
Portion of it weighed 53.010 grams.
placed in H2Oad 3:45 Nov 8th 1893
Removed at 3:45 PM. Nov 9th weighed 54.9
an increase of 3.46% due to water

50 grams Dexter gold sand
treated with chlor. + assayed
by Lead chlor
50 grams ore } mixed
200 " Lead
5 " Borax
50 " Lead

100 grams Burnham Old sand assayed
50 " per scorifier } mixed
200 " Lead
5 " Borax
50 " Lead on lip.

Examination of a mineral
received from Carbon & Centre
N. Alberta, N.W.T.

Appears to be fine-grained opaque white
[illegible] H_2O, Al_2O_3, SiO_2, $CaCO_3$
The mineral is of a light green
[illegible] specific gravity, has a hard
[illegible] and contains no [illegible] SiO_2

[illegible] H_2O, Al_2O_3 and
[illegible] which [illegible] H_2O
[illegible]

#1 Nov 9th 1893

Cylinder [illegible] in the oven & heated to 500°F for 1 hours.
did not give off gases on removing from furnace.
Defiant 50 feet fell in wood-
for water test, see under #5

#2
brick heated to 450° for 1 hour,
gave off gases on removing from furnace.
defiant 50 feet fell on iron
for water test, see under #5

#3
brick heated to 400°F for 1½ hours
still gave off vapors when removed from the oven, but it was hard to the tongue
broke at 50 feet fell on wood
for water test, see under #5

#5
brick heated to 400°F for 1 hour
did not give off any gases on removing from the furnace, was hard when removed.
Defiant 50 feet fell on wood-
pattern weighed 28.440 grams Removed at 12:00 Nov 11
" 29.250 grams an increase of 2.84% in 22 hours, due to water

---

Tests of #1-2-3-4, in water
Immersed at 2:00 P.M. Nov. 10th

#1 - weighs 26.990 grams Removed at 12:00 Nov 11
" 28.700 " an increase of 6.39% in 22 hours due to water
#2 weighs 30.690 grams Removed at 12:00 Nov 11
" 31.310 " an increase of 2.46% in 22 hours, due to water
#3 weighs 22.720 grams Removed at 12:00 Nov 11
" 23.430 " an increase of 3.12% in 22 hours, due to water
#4 weighs 34.230 grams Removed at 12:00 Nov 11
" 35.000 " an increase of 2.9% in 22 hours, due to water

A [illegible]
[illegible] sheet

[illegible] first examined (at 11:00 AM
Nov 10th 1893) the water showed that —
[illegible] the liquid indicated
by the concave surface of the liquid.

at 11:00 AM , at 2:00 PM. at 4:30 PM

At 2:00 PM Nov 10th 1893 the water
[illegible] showing that absorption
had taken place.
at 4:30 PM Nov 10th 1893 the ~~water~~
~~had~~ ~~Broth~~ had become capillary
as shown by the sketch.

No 15th

Experiment to ascertain how long a piece of paper lasted. The hard end of paper only immersed

10% sol.

# 1 - 1 sec	no good
# 2 - 2 "	" "
3 - 3 "	" "
4 - 4 "	" "
5 - 5 "	" "

20% sol

6 - 1 sec	no good
7 - 2 "	" "
8 - 3 "	" "
9 - 4 "	" "
10 - 5 "	" "

30 - % sol

11 - 1 sec	no good
12 - 2 sec	" "
13 - 3 "	" "
14 - 4 "	" "
15 - 5 "	" "

40% sol

16 - 1 sec	no good
17 - 2 "	" "
18 - 3 "	" "
19 - 4 "	" "
20 - 5 "	" "

50% sol

21 - 1 sec	no good
22 - 2 "	" "
23 - 3 "	" "
24 - 4 "	" "
25 - 5 "	" "

60% sol

26 - 1 sec	no good
27 - 2 "	" "
28 - 3 "	" "
29 - 4 "	" "
30 - 5 "	" "

70% sol

31 - 1 sec	no good
32 - 2 "	" "
33 - 3 "	" "
34 - 4 "	" "
35 - 5 "	" "

80% sol

36 - 1 sec	no good
37 - 2 "	" "
38 - 3 "	" "
39 - 4 "	fair
40 - 5 "	"

90% - sp.g. 1.71

41 - 1 pure — fair
42 - 2 " — "
43 - 3 " — "
44 - 4 " — "
45 - 5 " — "

H2SO4 sp.g. 1.81

46 - 1 pure — no good
47 - 2 " — no good
48 - 3 " — " "
49 - 4 " — " "
50 - 5 " — " "

Examined the [illegible] variety
[illegible] Lysol of the Lysol Chemical Company

Does a hard black little way,
heavier than water.
Is not completely soluble in boiling
alcohol, a black mass remains at
the bottom to which the odor is due.
The boiling alcohol removes a considerable portion which on cooling
separates out in minute non
crystalline bulky masses.
A portion of the original substance
melted, and heated quite hot gave
vapors very much resembling thymic
acid vapors, both in appearance &
odor.
To some of the boiling alcohol solution
some HCl was added, & then H_2O was added,
after cooling was filtered, filtrate
was perfectly clear.
Ammonia added to HCl filtrate produces
a ppt of Al_2O_3
H_2S by gas gave yellow ppt, potash,
[illegible] meta antimonate gives
ppt of soda.

3 grams weighed out to be separated
dissolved in alcohol
Beaker & portion soluble in alcohol
weighs 17.600 grams
Beaker weighs 15.217 grams
Portion soluble in alcohol weighs
2.383 grams
Portion insoluble in alcohol weighs
0.617 grams.

No. 15th

Assay of Cleveland's American Iron for Titanium.

Two assays made, 50 grains each, digested in HCl.

Nov 17th

Sodium Resinate carrying strength of the following proportions, to be used for solutions in Yelande Batteries

#1

180 cc H_2O
24 gm Na_2OH (Yelande Soda)
136 " Resin

Add resin to water, add slowly 160 cc H_2O, hot.

Check [illegible] the 24 grams Na_2OH in 160 cc H_2O, by heat, it contracts to 145 cc & weighs 180 grams.

Made stock solution of 900 cc H_2O, 120 grams Na_2OH = 1020 grams, weighed 1040 grams.
208 grams (1/5) ~~weigh~~ = 184 cc -

#1

40 cc stock sol Na_2OH + 50 cc H_2O
90 " H_2O hot
65 grams Resin
0.1 volt

#2

50 cc stock sol in H_2O + 50 cc H_2O
75 " H_2O - 25 cc stock, hot -
65 grams resin
- 75 - 50 -
75 H_2O

#3

75 cc - stock - 50 H_2O
75 cc - H_2O
65 Resin

4

50 cc stock 50 cc H_2O
6.5 grains Resin
0.08 not cut

5

50 cc stock or C. 50 cc H_2O
6.5 grains Resin
50 cc H_2O

gave 0.1 not cut

6

60 cc stock sol 50 cc H_2O
6.5 grains
50 H_2O
~~not good~~

Nov. 18th 1893

Immersed my fore finger of the left hand, to a depth of about 2 3/4 inches, in 60 cc. of absolute ethyl alcohol to find how much fat would be dissolved out in 1 hour.

The following sensations were produced. Immersed at 8.10 A.M. At 8.15 The finger feels dry and parched. It is most uneasy at the end, especially under the nail. At 8.18 the finger feels stiff. at 8.30 The finger feels as if it was under an air pump, a sensation of line strength sucked. at 9.05 finger feels normal, except around & under the nail where a sucking sensation is felt. Finger removed at 9.10, after removing, feels quite stiff and the skin is white as the death. The flesh had not gone down much, the finger did not feel right again for over 24 hours.

Weight of imprinting disk 26.7105 fat weighs
Weight of " " " + fat 26.7144 0.0039 gm

[illegible]
[illegible] weighed
26.707 grams
26.7144
26.7070
0.0074 grams weight of fat.

Nr 20 a

Immersed forearm in Mr. Mellis
[illegible] for 1 hour to find out
how much fat would be deposited
on it. The following sensations were
noted.
Finger immersed in 6 o.o at
10.30 Am.
at 10.40 fingers begin to feel stiff
at 10.50 fingers begin to feel "
a stinging smarting which contin-
ues all the time of immersion
at 11.00 a sucking sensation
is felt.
at 11.20 fingers feels very stiff
Removed at 11.35.
alcohol evaporated.
Weight of glass + fat, 26.726 grams.
" " " 26.705
0.021 "

10 gr.

analysis of rocks by Sherrill, and Van Edin by Alex. Ellis & Co.

iron	no
nickel	" copper
phos	" tungsten
silica	" molybden
titanium	" vanadium
manganese	" zinc
arsenic	" nickel
[illegible]	" cobalt
	" silver
	" mercury
	lead
	" bismuth
	" cadmium
	" gold
	" thallium
	" [illegible]
	" [illegible]
	" gold
	" tin
	" antimony
	" platinum
	" iridium

Found in our first hundred
flakes we took 30 grains being
[illegible] marks for determin-
[illegible]

Experiments for Lamp for
Phonograph cylinders

H 1 10 grams Trinidad asphalt
No good

H 2 10 grams Trinidad, 10 mg. Soda
hydrate
no good

H 3 10 grams Trinidad, 10 mg
soda hydrate, 2 grains
ozokerite.
no good

4 10 grams Trinidad, 20 mg
soda Hydrate, 3 grams Ozokerite
no good

5 – 5 grams Trinidad 20 mg
soda hydrate, 2 grams Ozokerite
No good

6 – 5 grams Trinidad, 20 mg soda
hydrate, 3 grams Ozokerite.
fair

7 – 5 grams Trinidad, 20 mg soda
hydrate, 3 grams Ozokerite
fair

8 – 5 grams Trinidad 20 mg Soda
Hydrate, 3 grams ozokerite
no good

9 - 5 grams trinidad, 2 grams Ozokerite, 2 grams syrian, 20 mg NaOH
no good

10 - 5 grams trinidad, 3 grams Ozokerite 3 grams syrian 25 mg NaOH. fair

#11 5 grams trinidad 3 grams Ozokerite, 2 grams syrian 25 mg. NaOH,
no good

12 - 5 grams trinidad 2 grams syrian, 20 mg NaOH
no good

13 - 5 grams trinidad, 2 grams soft mexican, 20 mg soda Hydr.
no good

14 - 5 grams trinidad, 3 grams soft mexican, 20 mg Sodalyde
no good

15 - 3 grams trinidad, 3 grams soft mexican, 2 grams ozokerite, 20 mg Soda Hydrate
no good

16 - 5 grams trinidad, 3 grams soft mexican, 3 grams ozokerite 20 mg soda hydrate
not good

17 - 5 grams trinidad, 3 grams mexican soft, 4 grams ozbinite, 25 mg. soda.
no good

18 - 5 grams trinidad, 4 grams mexican, 1 gram ozbinite 20 mg NaOH
no good

19 - 5 grams trinidad 3 grams mexican, 5 grams ozbinite 20 mg NaOH
moderate

20 5 grams trinidad 4 grams mexican 5 grams ozbinite 20 mg. NaOH
no good

21 - 5 grams trinidad, 5 grams soft mexican 5 grams ozbinite 20 mg NaOH
no good

22 - 5 grams trinidad, 5 grams soft mexican, 20 mg NaOH
no good

23 - 5 grams trinidad, 5 grams soft mexican, 1 gram ozbinite, 20 mg NaOH no good

24 5 grams trinidad, 5 grams soft mexican, 2 grams ozbinite, 20 mg. NaOH
no good

25 - 5 grams + 1d. 1 gram soft mexican 1 gram syrian 20 mg NaOH
no good

26 5 grams trinidad, 1 gram soft mexican, 2 grams syrian 20 mg NaOH
no good

27 5 grams trinidad, 1 gram soft mexican, 3 grams syrian 20 mg NaOH
fair

28 5 grams trinidad 1 gram soft mexican, 4 grams syrian 20 mg NaOH
no good

29 5 grams trinidad, 1 gram soft mexican, 5 grams syrian 20 mg NaOH
no good

30 5 grams trinidad, 2 grams soft mexican, 1 gram syrian 20 mg NaOH
no good

31 5 grams trinidad, 2 grams soft mexican, 2 grams syrian - 20 mg NaOH
no good

32 5 grams trinidad, 2 grams soft mexican 3 grams syrian 20 mg NaOH
no good

33 – 5 grams Trinidad, 2 grams soft mexican, 4 grams syrian 20 mg NaOH

34 – 5 grams trinidad 2 grams soft Mexican, 5 grams syrian, 20 Mg NaOH

35 – 5 grams trinidad, 3 grams soft mexican, 1 gram syrian 20 mg NaOH

36 – 5 grams trinidad 3 grams soft mexican, 2 grams syrian 20 Mg NaOH.

37 – 5 grams trinidad, 3 grams soft Mexican, 3 grams syrian 20 mg NaOH

38 – 5 grams trinidad, 3 grams soft mexican, 4 grams syrian 20 mg NaOH

39 – 5 grams trinidad, 3 grams soft mexican, 5 grams syrian 20 mg NaOH

40 – 5 grams trinidad, 4 grams soft Mexican, 1 gram syrian, 20 mg NaOH

41 - 5 grams Trinidad, 4 grams soft Mexican, 2 grams syrian 20 mg NaOH

42 - 5 grams Trinidad, 4 grams soft Mexican, 3 grams syrian 20 mg NaOH

43 - 5 grams Trinidad, 4 grams soft Mexican, 4 grams syrian 20 mg NaOH

44 - 5 grams Trinidad, 4 grams soft Mexican, 5 grams syrian 20 mg NaOH

45 - 5 grams Trinidad, 5 grams soft Mexican, 1 gram syrian 20 mg NaOH

46 - 5 grams Trinidad, 5 grams soft Mexican, 2 grams syrian 20 mg NaOH

47 - 5 grams Trinidad, 5 grams soft Mexican, 3 grams syrian 20 mg NaOH

48 - 5 grams Trinidad, 5 grams soft Mexican, 4 grams syrian 20 mg, NaOH

49 - 5 grams Trinidad, 5 grams soft Mexican, 5 grams syrian 20 mg NaOH.

50 – 5 grams Trinidad 1 soft Mexican, 1 Rosin, 20 mg soda
no good

51 5 grams Trinidad 1 soft mexican, 2 Rosin, 20 mg NaOH
no good

52 5 grams Trinidad 1 gram soft mexican, 3 Rosin, 20 mg NaOH
no good

53 5 grams Trinidad 1 gram soft mexican, 4 Rosin, 20 mg NaOH
no good

54 – 5 grams Trinidad, 1 gram soft Mexican 5 grams Rosin 20 Mg. NaOH
no good

55 – 3 grams Trinidad 2 grams soft mexican, 1 gram rosin 20 mg NaOH
no good

56 – 5 grams Trinidad, 2 grams soft mexican 2 grams rosin, 20 mg NaOH
no good

57 – 5 grams Trinidad 2 grams soft mexican, 3 grams rosin 20 mg soda
no good

58- 5 grams trinidad, 2 grams soft mexican, 4 grams rosin 20 mg NaOH
no good

59 5 grams trinidad, 2 grams soft mexican 5 grams rosin - 20 mg NaOH
no good

60 5 grams trinidad 3 grams soft mexican, 1 gram rosin 20 Mg NaOH
no good

61 - 5 grams trinidad, 3 grams soft Mexican, 2 grams Rosin, 20 mg NaOH
no good

62 - 5 grams trinidad, 3 grams soft mexican, 3 grams Rosin, 20 mg NaOH
no good.

63 - 5 grams Trinidad, 3 grams soft mexican, 4 grams Rosin, 20 mg NaOH
no good

64 - 5 grams Trinidad 3 grams soft mexican, 5 grams Rosin, 20 mg NaOH
no good

65, 5 grams trinidad, 4 grams soft mexican, 1 gram rosin, 20 mg NaOH
no good

66 - 5 grams trinidad, 4 grams soft mexican, 2 grams rosin, 20 mg NaOH
no good

67 - 5 grams Trinidad, 4 grams soft mexican, 3 grams rosin, 20 mg NaOH
no good

68 - 5 grams Trinidad, 4 grams soft mexican, 4 grams rosin, 20 mg NaOH
no good

69 - 5 grams Trinidad, 4 grams soft mexican, 5 grams rosin, 20 mg NaOH
no good

70 - 3 grams Trinidad, 5 grams soft mexican, 1 gram rosin, 20 mg NaOH
no good

71 - 5 grams Trinidad, 5 grams soft mexican, 2 grams rosin, 20 mg NaOH
no good

72 - 3 grams Trinidad, 5 grams soft mexican, 3 grams rosin, 20 mg NaOH
no good

73 - 5 grams Trinidad, 5 grams soft mexican, 4 grams rosin, 20 mg NaOH
no good

74 - 5 grams Trinidad, 5 grams soft mexican, 5 grams rosin, 20 mg NaOH
no good

75 - 5 grams Trinidad, 1 gram pitch, 1 gram cumarula, 20 mg NaOH
no good

76 - 5 grams Trinidad, 2 grams pitch, 1 gram cumarula, 20 mg NaOH
good

77 - 5 grams Trinidad, 3 grams pitch, 1 gram cumarula, 20 mg NaOH
no good

78 – 5 grams trinidad 4 grams pitch
1 gram camauba, 30 mg NaOH
no good

79 5 grams trinidad, 5 grams pitch,
1 gram camauba 30 Mg NaOH
no good

80, 5 grams trinidad 1 gram pitch,
2 grams camauba, 30 mg NaOH
no good

81, 5 grams trinidad, 2 grams pitch
2 grams camauba, 30 mg NaOH
no good

82 5 grams trinidad, 3 grams pitch,
2 grams camauba 30 mg NaOH
good cost 2.8 cts lb.

83, 3 grams trinidad, 4 grams pitch
2 grams camauba 30 mg NaOH
good cost 2.6 cts lb

84 5 grams trinidad, 5 grams
pitch, 2 grams camauba, 30 mg NaOH
no good

85, – 5 grams trinidad 1 gram pitch,
3 grams Camauba 30 mg NaOH
no good

86 – 5 grams trinidad 2 grams pitch,
3 grams camauba, 30 mg NaOH
fair,

87 – 5 grams trinidad 3 grams pitch
3 grams camauba 30 mg NaOH
good cost 3.3 cts

88, 5 grams trinidad 4 grams pitch
3 grams camauba, 30 mg NaOH
good 3.8 cts lb

89 5 grams trinidad 5 grams pitch
3 grams camauba, 30 mg NaOH
fair,

90, 5 grams pitch, 1 grams soft mexican, 1 gram carnauba, 30 Mg. NaOH
fair,

91, 5 grams pitch, 2 grams soft mexican, 1 gram carnauba, 30 mg NaOH
fair,

92, 5 grams pitch, 3 grams soft mexican 1 gram carnauba, 30 mg NaOH
good 3 1/4 cts Cl

93, 5 grams pitch, 4 grams soft mexican, 1 gram carnauba 30 mg NaOH
good 3.27 cts cl

94 - 5 grams pitch, 5 grams soft mexican 1 gram carnauba 30 mg NaOH
good 3.45 cts

95, 5 grams pitch, 1 grams soft mexican, 2 grams carnauba 30 mg NaOH
good 3.34 cts

96 5 grams pitch, 2 grams soft mexican 2 grams carnauba 30 mg NaOH
good 3.64 cts

97 - 5 grams pitch, 3 grams soft mexican 2 grams carnauba, 30 mg NaOH
good 3.67 cts

98 5 grams pitch, 4 grams soft mexican 2 grams carnauba 30 mg NaOH
no good

Rosin 1/2 ct	lb -
Soft Mexican	5 cts
Cuban, soft	4.5
" hard	4.—
Trinidad	1 1/2
Pitch (coal tar)	3/4 - 1 ct
Ozokerite	7 cts
Syrian	8 cts - 10 cts
NaOH	3 cts
Carnauba wax,	9 + cts

100 - duplicate of #99 75 mg NaOH
fair,

99 - 5 grams pitch, 5 grams soft mexican, 2 grams carnauba 30 mg NaOH
good 3.9 cts

In verifying the if the assay does not give litharge refuse, pour out, remove slag, add fresh borax, cut down until it does scorify. do not heat too much or blow out at, it must be hot enough so that no litharge remains on the surface - but skim as fast as it is formed.

In cupellation if a thick non volatile crust of PbO forms place some charcoal in front of the cupel & open the door slightly wide.

In a few minutes, the PbO is removed & the oxidation goes on nicely.

In an Orange heat is about the proper temp.

$7e\,SO_4 = 7e_2\,SO_4 +$

$7e\,SO_4 = 7e_2\,(CO_4)_3$

$7e\,SO_4$

$7e\,SO_4$

$SO_4 + H_2O = H_2SO_4$

7.95 85
86.610
85.170
3.440 / 85.17 / 344.000 (4
340680
3320

.05814
156
34884
29070
581.4
91.6784

$Na_2CO_3 + 10H_2O$ = 286
Na_2CO_3 = 106

500 2240 / 5200 (2.23
4480
5200
4480
7200

2.23 lbs 1 cf.
2.23 / 10.0000 (4
9.92

500 / 2240.00 (4.0
2000
240

Weight of small pitcher . 451 gm
" " large " 585 "
" " dish 157 "

645 865
451 585
194 280

103 870
97.400
6.470

97.4 / 6.470 (0.64
8441
6660
5844
4160

$Na_2CO_3 + 10 aq$ = 180
40
106 12
106 : 286 x 15 46
530 286
106
286 / 1590 (5.56
1430
1400
1430
1700

50 grams of 5 mesh furnace ashes from Scranton anthracite coal was treated with a 10% sol. of the SO2 as a steam bath for 1½ hours

Assay of a Zinc Ch. -
digested in HCl, left a fine silica residue -
treated with H2S after some time, gave ppt of sulphur indicating Fe in ferric state
filtered boiled, added NH4OH, gave fawn ppt of Fe2O3 -
addition of (NH4)2S gave no ppt, no zinc -

Contains Fe, Al.

Assay of Alloy of Fe & Ni

Weight 0.3188 grams

Crucible weighs 12.335

" 12.715

0.380 grams Fe_2O_3

.70

28600

286 mg Fe

112 × 100

160) 11200 (70%

1120

Crucible weighs 12.3365 grams

12.4090

.0725

319) 267.0000 (83

2552

1180

957

2230

Standardization of Sodium hydrate for Stearic Acid Analysis.

9.9 – 10.2 = 0.3

50 cc. Alcohol requires 0.3 cc of Standard Alkali solution to neutralize it

1 gram pure Stearic Acid – dissolved in 50 cc Alcohol.

10.2 – 27.8 – 0.3 = 17.3 = 1 gram pure stearic acid

second determination with 1 gm

28.1

third determination

49.7 67.1 = 17.4 – 0.3 = 17.1

67.2 – 84.7 17.5 – 0.3 = 17.2

1 cc = 0.05814 gram stearic acid.

Weight of soda 440, 420, 185, 700

0.80319
0.80319
88.3509

137
12
48

197) 504.000 (2.5
394
1100
985
1150

137
14
1

154) 504.000 (3.28
462
420
308
1120

1.1.1 0.80319
0.80319
0.80319
81.15409

17.3) 1.000000 (0.5788
865444
1350
1211
1390
1384
17.2 00

0.80319
1.01
48 1914
80319
54 3814

1.91
143 — 17.2) 1.000000 (0.5814
1.61
1720
1400
1376
240
172
680
688

1.61) 143.000 (8.88
128.8
1420
1288
132

We 50 mod bri. 0 Wind to
pressed 30 lbs. 100 feet Power
to low of two inch 4 inch
plant & Grease lubricant
fertilizer, farm implements
buggy yell 4 inch 4 chain
Kiamme on 3 spotting at first
to point where plies per just be
glue to melt together

80 -100 62 x
46000 62
.8
6
.8) 62.00 (77.5
56
60
56
40

5814
17.2
11628
40698
5814
1.000008

0.58
17.2
1156
4046
58
1.8941 6

Cenne 612.5
745 10 — 1

331 30 — 4
1.76 8

135.525 331000 (2
271050
0

135725) 331000 (2

331) 135725 (4
1324

050319
96
4819914
722871
34748624 8
1.76) 135
1408

Filling Means Cin

1 Gram - 36.2 -
47.3

135.810 1.1 1.0
134.285 080319
1.525 080319
080319
1.15409

.05814
141
5814
22256
5814
8147774
680319
96
2419114
722871
14706624

52.5
17.5
350

1.523) 134.285000 88
122000
12285
12200

625
.964
2500
3750
5625
60.2500

65 - 250
42 570

22.660

280
194
478
237
3
74.2
62.6
106

23.5) 22.660000 (.964
21 15
1510
1440
1000

8.1

413) 33.5000
3304
460